

REMARKS

Applicants have received and reviewed the Final Office Action dated October 1, 2009. The date for response is extended from January 1 (a Federal Holiday falling on a Friday) to January 4, 2010. Claims 1-3, 6, 8, 11 and 22-25 are pending. Claims 4-5, 7, 9-10, and 12-21 were previously canceled. Claims 1, 6 and 22-23 are amended and no new matter has been added. Support for the amendments may be found throughout the specification, for example at figures 4 through 18. This response is presented to clarify the present invention and does not present or raise a new issue.

35 U.S.C. § 103

At page 2 of the Action, claims 1, 2, 6, 11, 22 and 24 were rejected under 35 U.S.C. 103(a) over Shinichi et al. (JP8323845) in view of Uhlig (US 3,740,181), Hagano et al. (US 2002/0125254), and Hurst (US 3,499,071). Alternatively, at page 4 of the Action, claims 1, 2, 6, 11, 22 and 24 were rejected under 35 U.S.C. 103(a) over Shinichi et al. in view of Uhlig, Hagano et al. and Martin et al. (US 4,320,789). Applicants respectfully traverse these rejections.

First, without acquiescing to the rejection and solely to further prosecution, Applicants have amended independent claims 1, 6 and 22. Amended claims 1 and 22 recite, in part, "a bottle-shaped blow mold having a handle forming portion of which the opposing two parts are configured to meet each other when they penetrate the body of the bottle through the cut-off aperture of the handle section." Amended claim 6 recites, in part, "a bottle-shaped blow mold having a handle forming portion of which the opposing two parts are configured to meet each other when they penetrate the body of the fourth PET container through the cut-off aperture of the handle section." Amended claim 22 further recites, in part, "a bonding apparatus for bonding a cut-off portion remaining in a handle section after cutting off a compressed portion of the handle section of the PET bottle which was stretched by blowing previously."

Second, there are generally three basic types of polymers that are distinguished by molecular arrangement. They include: (1) amorphous polymer; (2) crystalline polymer; and (3) PET (crystallizable polymer). An amorphous polymer has a completely random molecular

arrangement like spaghetti in a bowl. Some examples include PVC and glass. A crystalline polymer characteristically associates in a highly ordered manner to form crystals; however, this may be prevented by cooling them. An example includes PBT. PET may be amorphous or crystallizable. The type and amount of PET crystallinity may be controlled.

“Orientation” promotes the crystallization of PET. Orientation is the process of aligning molecules in an orderly fashion by stretching. When blowing bottles by injection blowing, the bottles are generally stretched to about eight times their original length. During this process, the molecules line up and grab each other. The strength of the bottle is enhanced several times. Therefore, the promotion of orientation creates stronger bottles with less material. PET bottles are light, strong, cheap, and widely used in the beverage industry

Temperature is important to the orientation process. The orientation of PET is performed by stretching at about 100°C. When the temperature is too hot, the orientation does not occur. When the temperature is too low, the PET develops microtears or fractures.

When PET is not oriented, it may be thermally bonded to itself under compression and heating. However, once the PET is oriented uniaxially or biaxially, the PET fails to bond to itself under the application of compression and heat. Ultrasonic welding does support some oriented PET bonding but ultrasonic welding makes the oriented PET brittle and the area of bonding peels off.

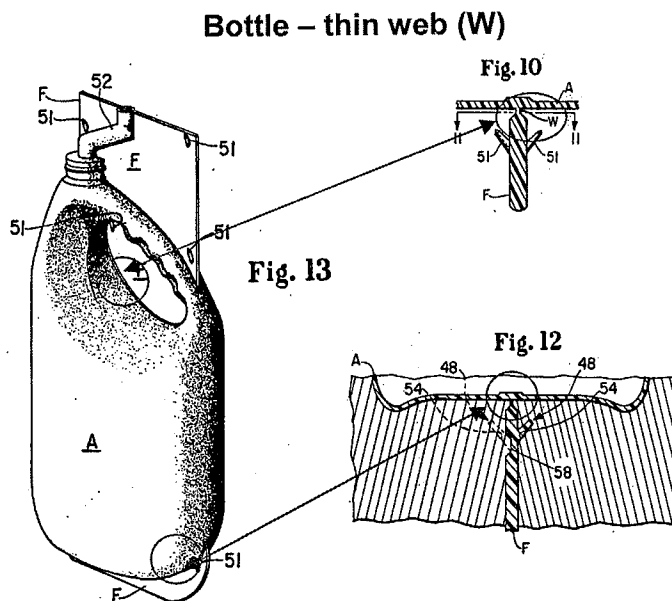
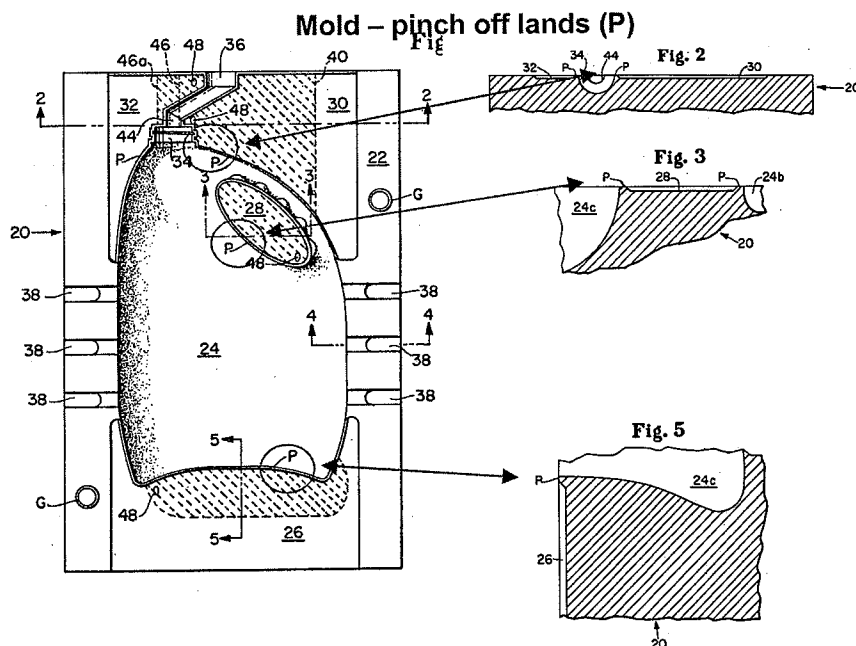
The viscosity of PET plays an important role in molding. PET has a very low melt strength compared with other polymers. This low melt strength causes PET to sag promptly after extrusion from the extruder. Importantly, PET’s orientation point is about 100°C, a significant drop in comparison with PET’s melting point, 300°C. Therefore, to prevent sagging of the PET, it must be cooled from 300°C to 100°C immediately after extrusion occurs. Otherwise, sagging occurs. This control of temperature is practically impossible. Therefore, to utilize PET in extrusion blow molding without experiencing sagging, the extruded parison of the PET must first be cooled to room temperature by watering. After the initial cooling, the parison may be heated to 100°C for stretching.

By comparison, extrusion blow molding is a simpler process than injection blow molding; however, bottles produced by injection blow molding are generally considered better. Bottles produced by extrusion blow molding: (1) result in thicker walls and heavier weight due to decrease stretching; (2) result in poor orientation and decreased strength because biaxial stretching is not applicable; (3) suffer from unbalanced stretching; and (4) require a cutting process to cut the flash after the blowing resulting in poor appearance. In addition, the added steps of immediately cooling the parison down to room temperature before reheating the parison up to the stretch temperature fail to overcome the above listed deficiencies. Therefore, PET bottles manufactured by injection blow molding have higher quality, cost less, and utilize a simpler process.

Prior to the presently claimed invention, PET bottles with integrated handles which penetrate the body of the bottles could not have been made by injection blow molding because it required the preform be blown and stretched at least once prior to compressing, cutting, and bonding the handle section. As discussed earlier, bonding oriented PET is not feasible. The presently claimed invention overcomes this problem by using a novel insert injection molding arrangement and method.

The Office Action asserts that Hurst discloses a mold which penetrates the body in the handle forming area. Applicants respectfully disagree. As seen in Figures of Hurst reproduced on the next page (it being noted that the left side of Fig. 1 and Figures 2, 3 and 5 reproduced with captions and arrows added). The mold of Hurst has pinch-off lands, referred to as P. The pinch-off lands are aligned to press the parison in order to weld the pressed portion. Therefore, even if the mold closes tightly, the opposed pinch-off lands (P) never meet each other because there is always a web between them (as seen in the bottom Figure on the following page—e.g., Fig. 13 of Hurst with captions, circles and arrows added). In other words, the above pinch off lands “P” never penetrate the body and meet with each other, but press and weld a predetermined area of the bottle. By contrast, the handle forming portion of the presently claimed invention only passes through the area previously cut to meet with each other in order to form the final shape of

the bottle. This presently claimed step is not concerned with the function of pressing and bonding required by Hurst's pinch-off lands (P). In the presently claimed invention, the handle Forming portion acts as a model and the bottle blown in this model has a shape which the wall of the inner edge portion of the bottle surrounds causing the bonded portion to protrude inwardly.

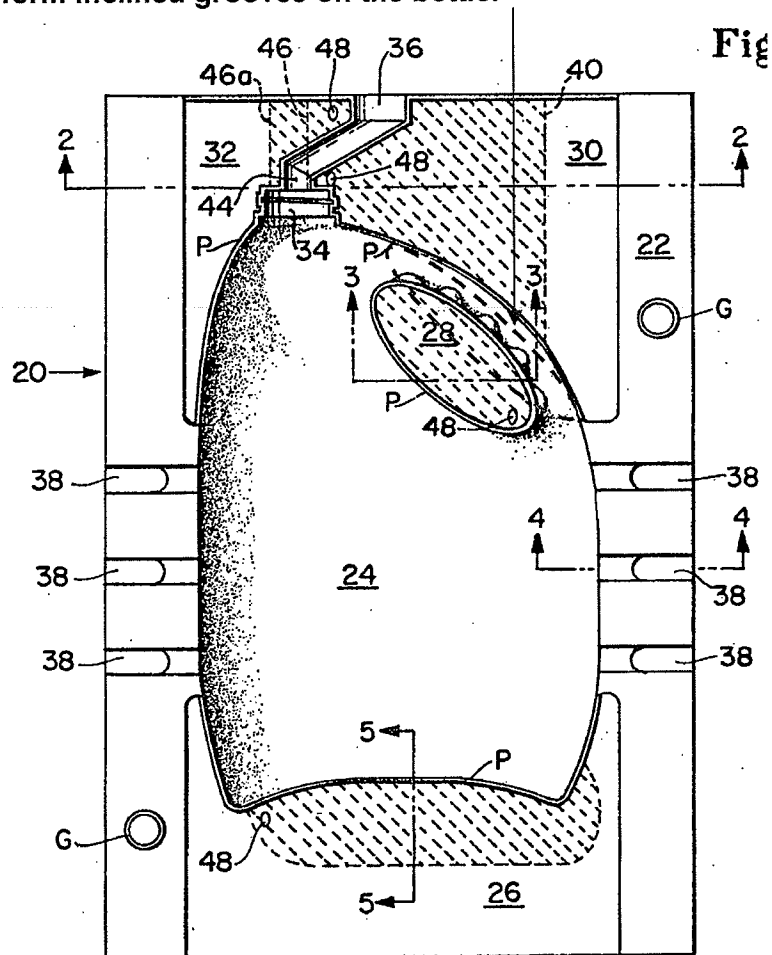


The Office Action further alleges that Hurst's mold penetrates through the finger grooves in Fig. 1. The finger groove portion of Hurst's bottle is inclined and closed to facilitate user comfort (e.g., similar to the Tide bottle shown below).

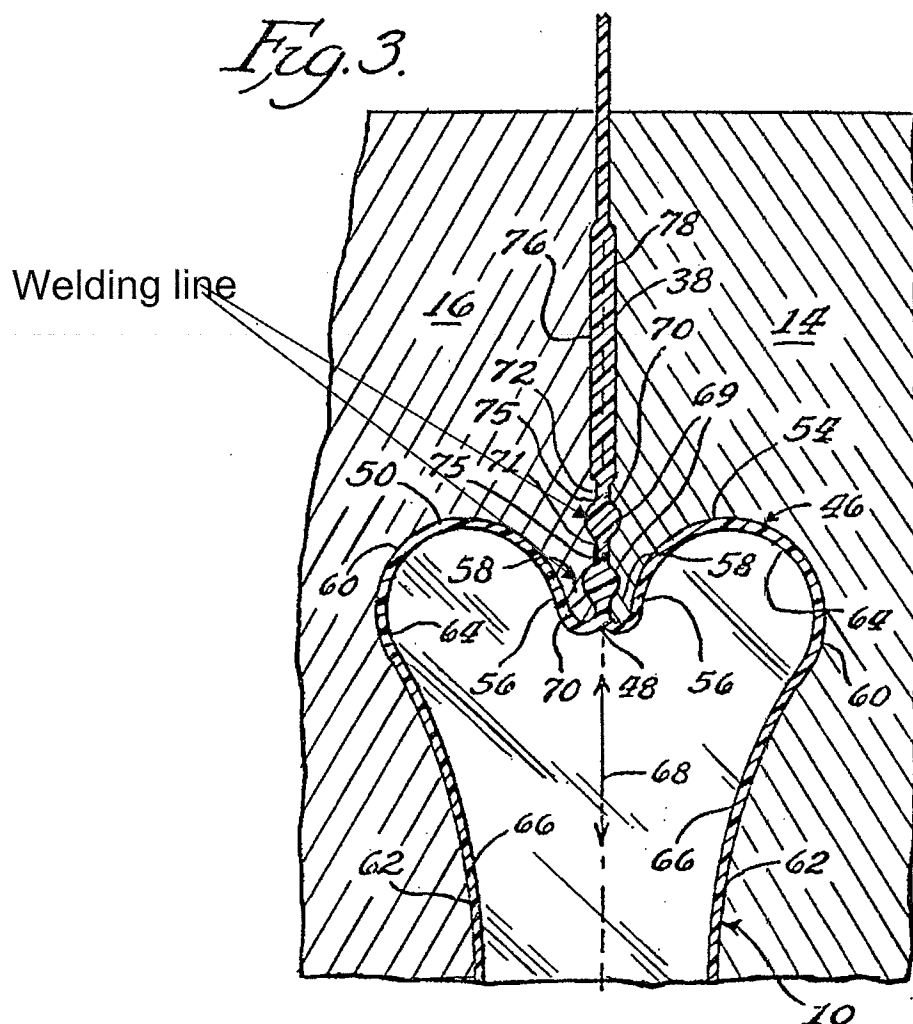


The mold in Fig. 1 of Hurst has a five finger groove forming portion that has an inclined surface that never penetrates the bottle, but forms inclined finger grooves on the bottle. Thus, the finger grooves of Hurst's mold never penetrate the body of the bottle, as illustrated in the left hand portion of Fig. 1 of Hurst set forth on the following page (it being noted that the caption, dotted oval, and arrow have been added to the Fig.).

Five finger groove forming portion of the mold has inclined shape and never penetrates the bottle.
They form inclined grooves on the bottle.



Like Hurst, the mold in Martin just presses the parison to weld and make the flash. In other words, there is no penetration of the body, just the pressing and welding of a predetermined area of the bottle (as seen in Martin Fig. 3 on the following page, where the caption and arrows have been added). By contrast, the handle forming portion of the presently claimed invention only passes through the area previously cut to meet with each other in order to form the final shape of the bottle. This presently claimed step is not concerned with the function of pressing and bonding required by Martin.



The presently claimed invention has a handle forming portion whose opposing two parts are configured to meet each other when they penetrate the body of the bottle through the cut-off aperture of the handle section. As discussed above, Martin and Hurst both fail to disclose or suggest at least this novel feature. Further, none of the additionally cited references overcome this deficiency. Therefore, the combination of the above cited references fails to render the presently claimed invention obvious.

At page 7 of the Action, claims 3 and 8 were rejected under 35 U.S.C. 103(a) over the previous

combination of Shinichi et al. in view of Uhlig, Hagano et al., and Hurst or alternatively over the previous combination of Shinichi et al. in view of Uhlig, Hagano et al. and Martin et al. as applied to claims 1 and 6 above, and further in view of Fischer et al. (US 4,123,217). Applicants respectfully traverse these rejections.

Claims 3 and 8 depend from independent claims 1 and 6, respectively. Therefore, claim 3 requires all the limitations of claim 1 and claim 8 requires all the limitations of claim 6. In view of the above arguments and without acquiescing to the Examiner's characterization of the cited art, Applicants submit that claims 3 and 8 are in condition for allowance. Applicants respectfully request withdrawal of these rejections.

At page 9 of the Action, claims 1, 2, 6, 11, 22 and 24 were rejected under 35 U.S.C. 103(a) over Uhlig in view of Mojonnier et al. (US 3,366,290), Hagano et al. and Hurst. Alternatively, at page 11 of the Action, Claims 1, 2, 6, 11, 22 and 24 were rejected under 35 U.S.C. 103(a) over Uhlig in view of Mojonnier et al., Hagano et al. and Martin et al. Applicants respectfully traverse these rejections.

In view of the above arguments with respect to the Hurst and Martin references (and without acquiescing to the Examiner's characterization of the cited art), Applicants submit claims 1, 2, 6, 11, 22 and 24 are not rendered obvious by the combination of references. Applicants respectfully request withdrawal of the rejections.

At page 13 of the Action, claims 3 and 8 were rejected under 35 U.S.C. 103(a) over the previous combination of Uhlig in view of Mojonnier et al., Hagano et al. and Hurst or alternatively over the previous combination of Uhlig in view of Mojonnier et al., Hagano et al. and Martin et al. as applied to claims 1 and 6 above, and further in view of Fischer et al. Applicants respectfully traverse these rejections.

Claims 3 and 8 depend from independent claims 1 and 6, respectively. Therefore, claim 3 requires all the limitations of claim 1 and claim 8 requires all the limitations of claim 6. In view

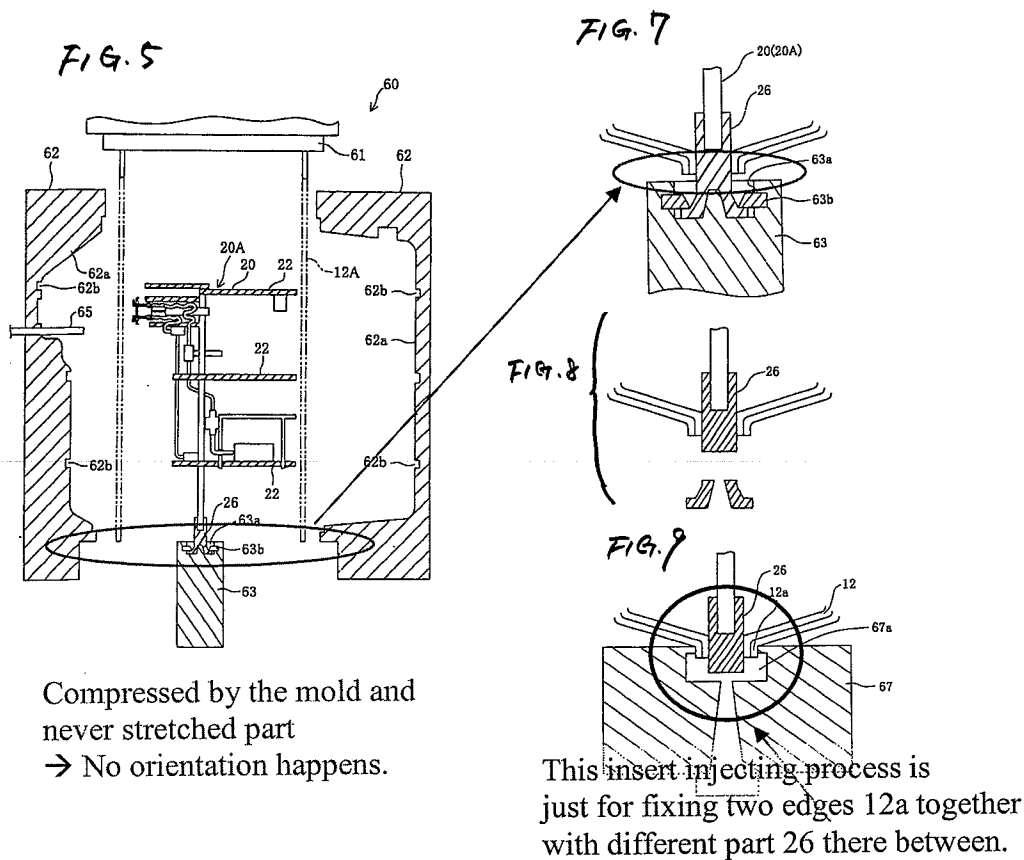
of the above arguments and without acquiescing to the Examiner's characterization of the cited art, Applicants submit claims 3 and 8 are in condition for allowance. Applicants respectfully request withdrawal of the rejections.

At page 15 of Action, claims 23 and 25 were rejected under 35 U.S.C. 103(a) over Shinichi et al. in view of Hagano et al. and Hurst. Alternatively, claims 23 and 25 were rejected under 35 U.S.C. 103(a) over Shinichi et al. in view of Hagano et al. and Martin et al. Applicants respectfully traverse these rejections.

First, without acquiescing to the rejection and solely to further prosecution, Applicants have amended independent claim 23. Amended claim 23 recites, in part, "bonding a cut-off portion remaining in the handle section after cutting off a compressed portion of the handle section of the PET bottle which was stretched by blowing previously; b) mounting the PET container to a bottle-shaped blow mold having a handle forming portion of which the opposing two parts are configured to meet each other when they penetrate the body of the PET container through the cut-off aperture of the handle section." It is also noted that claim 25 depends from claim 23.

Second, as previously explained, stretched and oriented PET cannot be effectively bonded by general bonding methods. The presently claimed invention recites a bonding method with insert injection molding in order to solve the above discussed problem.

The Office Action alleges that Hagano shows the presently claimed bonding. Applicants respectfully disagree. Hagano uses extrusion blowing, wherein the end portions (12a) of the parison, pressed and held by the mold, are never stretched and oriented (see the Figs. of Hagano reproduced on the next page, where the captions, arrows, Fig. numbers and circle/ovals have been added). In other words, the Hagano apparatus holds third part (26) very strongly between the end portions (12a) even though they can be bonded by general bonding method. This integrated method, that integrates several parts together, is just a traditional method and already well known to plastic manufacturing field.



Hagano only discloses the integration of several parts together in order to fix them firmly. Therefore, Hagano alone or in combination fails to disclose and/or suggest the presently claimed invention. The presently claimed invention enables the bonding of stretched and oriented polymer and conceals the cut-off and bonded protruding part through final blowing. No combination of the above references renders the presently claimed features of claims 23 and 25 obvious.

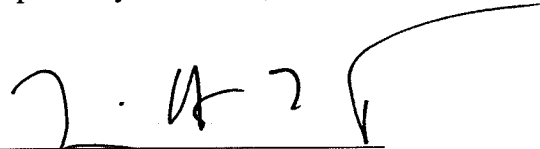
Reconsideration and withdrawal of the rejections is requested.

Summary

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

4 January 2010
Date



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